3 - Service Software

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Service Software

Phoenix

Phoenix is the new generation Service Software. It has been designed to meet the challenges in servicing modern cellular phone technology.

The Phoenix program has been built using component architecture. This means that the actual program is small and most of the program's functionality is divided into dynamically loaded modules (DLLs).

Supported Operating Systems

Windows 98, 2000, ME and NT 4.0 (SP4).

Hardware requirements for using Phoenix

Minimum:
Processor 233 MHz, RAM memory 64 MB, Disk space 50-100 MB.

Recommended for Windows 2000:
Processor 700 MHz, RAM memory 512 MB, Disk space 50-100 MB.

Introduction

This section briefly describes how to install the Phoenix software and includes some basic information on how to use the program. For more detailed information, please refer to Phoenix's **Help -files**. Each feature in Phoenix has its own Help function, which can be activated while running the program.

Press the *F1* key or the feature's Help-button to activate a Help -file.

Installing Phoenix

1. Download the latest release. Please contact your regional After Market Services point for information on where to download the latest release.

Download and read the release notes, which have useful information on the software version you are using.

2. Download the latest data packages for the products you will be using.

3. Before you start installing the program, check that

- the dongle is attached to parallel port. Contact your supervisor in order to obtain a suitable dongle.
- you have administrator rights (Windows 2000 or NT only). This is required in order to be able to install Phoenix.

4. Install Phoenix by executing the Phoenix installation package and follow the instructions on the screen.

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Initially the setup files are extracted into the file system.

Note: If the setup files are already extracted (left in the file system from previous installation) "Overwrite Protection" dialog appears. Always click "Yes to All" to overwrite the existing setup files.

5. The installation checks that the latest supported dongle driver version is installed. The dongle driver is installed if there is no previous installation of the dongle driver or if the installed dongle driver is older than the latest supported version.

Note: If the dongle driver is installed during installation, you need to reboot your PC and restart the installation after reboot.

Program files are stored under " C:\Program Files\Nokia\Phoenix" (default).

6. Install the data package by executing the installation package and follow the instructions on the screen.

The data packages will create product specific directories under the installation directory.

Data files are stored under " *C:\Program Files\Nokia\Phoenix*" (default).

Uninstalling Phoenix

If you need to remove Phoenix Service Software from your computer:

1. Make sure that the dongle is attached (unregistration).

2. Go to the Control Panel and select **Add/Remove Programs.**

3. Select NHM-10 RELEASE for uninstallation and click **Add/Remove**.

4. Click **OK** to remove the application

You may have to reboot your PC after uninstallation.

Note: If you have different product packages installed, the components are uninstalled only if they are not included in other product packages.

Data Packages

Data Packages (DP) is a name for a helpful feature in the Phoenix software. This type of feature provides a flexible way of distributing and installing Phoenix and its data files.

All product-specific data is separated from the program code and installed separately. This means that the installation is performed in at least two steps.

Each product will have its own Data Package (DP). The FPS-8 flashing equipment also has its own package.

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Starting a session

Concepts

In the Phoenix context, *Product* means the cellular phone attached to a PC. More specifically, it is a particular type of phone.

Connection means the type of cable used to attach the phone to the port to which the other end of the cable is attached.

Selecting a product

Many of Phoenix's features are product-specific. It is, therefore, mandatory to choose the product you will be working on at the beginning of the session.

Select the menu item *File - Choose Product.* You will be presented with a list of available products.

After the product selection, you will see an additional menu item on the main menu. If you take a look at the available menu items, you will see that their number has increased.

Selecting a connection

The connection defines the cable and the communications port that will be used when connecting to the phone.

1. Active connections are listed in the toolbar's *Connection* pull-down menu. You should make sure that the connection is correct before using the software. Change it, if necessary.

In case the connection is the wrong, you need to create a new one.

2. Select *Settings* from the pull-down menu .

3. Select *Add* in the *Connection List Dialog* and in fill the relevant fields in the *Connection setup* dialog.

Phoenix environment

You can configure the program's main toolbar and the product or tool -specific options to your liking.

You can control which toolbars are visible by selecting **View** and **Toolbars** from the pull-down menu. The visible toolbars are marked with a check.

The rest of the options are product or tool -specific. The tool-specific options are set using the associated toolbar.

Using components

When working with Phoenix, each task generally has its own component that will perform the task. The first thing, therefore, is to open the desired component.

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Opening a component means that you open a tool window within Phoenix. When this window is opened, Phoenix also opens a toolbar for it and adds component-specific menu items in the **View** menu.

Using profiles

A Profile is a useful feature in the software. Product, connection and currently open components can be stored into a permanent storage (a disk file called profile, *.nmp) for later retrieval.

Opening and saving profiles is done via menu commands found in the **File** menu. Select *Open Profile* and *Save Profile*.

Since profiles are stored into a disk file with the user-defined name, there can be multiple profiles for different repeated tasks.

SW update flashing setup

FPS-8 Flash setup

The following equipment is required for 3600 (NHM-10) AMS SW update, when connecting NHM-10 to PC with FPS-8:

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Item	Description	Type	Code
1	Docking station adapter	MJF-31 (use with JBV-1)	0770478
1a	Point of Sales flash loading adapter	FLA-48	0770582
2	Power cable	PCS-1	0730012
3	Power cable	FLC-2	0730185
4	Modular cable	XCS-4	0730178
5	Flash prommer box sales pack	FPS-8	0080321
6	Printer cable	AXP-8, incl in FPS-8 sales pack	
7	D9 – D9 cable	AXS-4 , incl in FPS-8 sales pack	0730090
8	Software protection key	PKD-1	0750018
9	AC Charger,	incl in FPS-8 sales pack	0680032
10	SRAM Module (2 pcs needed inside FPS-8)	SF12	0080346 (Code includes one SRAM module)

POS Flash concept

The following equipment is required for 3600 (NHM-10) AMS SW update, at point of salewhen connecting NHM-10 to PC with FLS-4:

Item	Description	Type	Code
1	Point of Sales flash loading adapter	FLA-48	0770582
2	Service cable	XCS-1	0730218
3	FLS-4S sates pack for E & A	FLS-4S	0080541
4	FLS-4S sates pack for APAC	FLS-4S	0080542
5	FLS-4S sates pack for US	FLS-4S	0080543

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Module Jig Flash concept

The following equipment is required for 3600 (NHM-10) AMS SW update when system module is placed in the Module Jig MJS-51 and connected through a FPS-8 set-up:

Item	Description	Type	Code
1	Module Jig	MJS-51	0770579
2	Power cable	PCS-1	0730012
3	Modular cable	XCS-4	0730178
4	Flash prommer box sales pack	FPS-8	0080321
5	Printer cable	AXP-8, incl in FPS-8 sales pack	
6	D9 – D9 cable	AXS-4 , incl in FPS-8 sales pack	0730090
7	Software protection key	PKD-1	0750018
8	AC Charger,	incl in FPS-8 sales pack	0680032
9	SRAM Module (2 pcs needed inside FPS-8)	SF12	0080346 (Code includes one SRAM module)

Note: All tunings except Zocus calibration can be done with JBV-1/MJF-31 concept by using XRF12 RF cable.

NHM-10 Phoenix installation instructions

Now that cables have been connected, you must install NHM-10 version of Phoenix to your PC.

- 4.13.005 is currently the newest available NHM-10 AMS Phoenix SW

NOTE! You must use 2003.17.3.12 Phoenix release in order to get new SW into your Nokia 3600.

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- Save the package to your hard disk and install it by doubleclicking it.

NOTE! It is recommended that you uninstall previous Phoenix package before installing the new one. Do it as follows:

- Click Start -> Settings -> Control Panel
- Add/Remove Prog.
- Phoenix NHM-10 release
- Add/Remove

Reboot your computer after uninstallation

FPS-8 to PC connection Setup instructions

Establish connection between your PC and FPS-8. The procedure is as follows:

- Start phoenix
- Choose **File** -> **Manage connections**
- Choose **Add**
- Select mode, select **Manual**
- As Media, select **FPS-8**
- Port number, select the port where you have connected the serial cable of FPS-8.
- COMBOX_DEF_MEDIA, select **FBUS**
- Click on **Finish**
- Press **Arrow up** key so that FPS8 COM1 FBUS becomes the first on the list.
- Press **Apply** and close the window

The connection between PC and FPS-8 has now been configured.

FPS-8 activation

Follow the instructions inside FPS-8 sales pack to get FPS-8 activated.

Checking Application SW version inside FPS-8

When you have connection established to FPS-8 and FPS-8 has been activated, the first thing to do is to check that you have correct application SW version inside FPS-8. Phoenix SW can check that automatically. The procedure goes as follows:

Go to the partner web site and take newest AMS FPS-8 SW.

Instructions:

- Click Fps-8 downloads
- Click **Flash Update**

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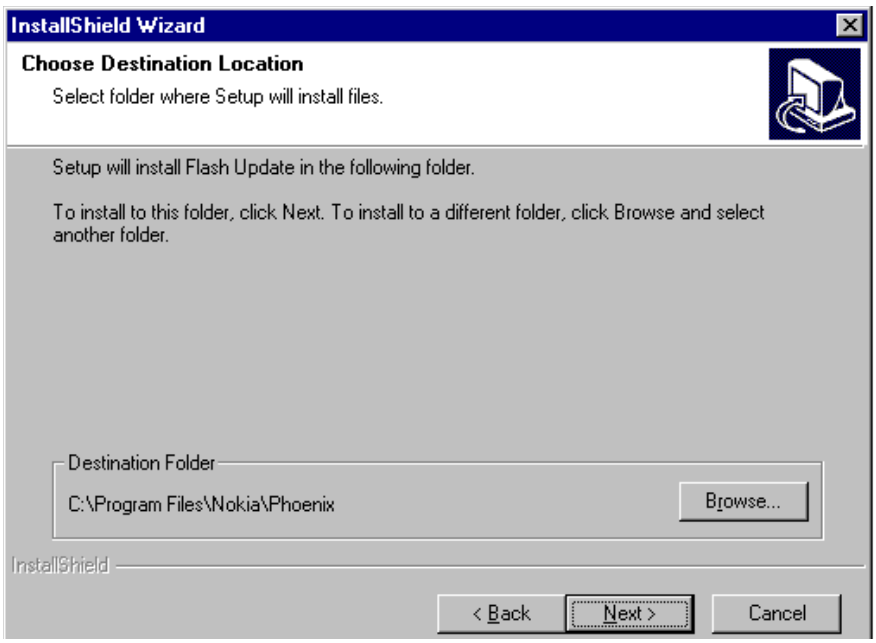
- Click **AMS/Production version**
- Click 2.10.000
- Take file **flash_update_02_10_000.exe**
- Save it to your hard drive to a place which you can remember
- Go to that directory and click on **flash_update_02_10_000.exe**

You will see the following note on your screen. Install files to the directory which installation program suggests to you.

Figure 1: InstallShield Wizard screen


InstallShield Wizard
Choose Destination Location
Select folder where Setup will install files.
Setup will install Flash Update in the following folder.
To install to this folder, click Next. To install to a different folder, click Browse and select another folder.
Destination Folder
C:\Program Files\Nokia\Phoenix
Browse...
InstallShield
< Back
Next >
Cancel

When the installation has been finished, FPS-8 files are located in that directory.

You can now start phoenix SW.

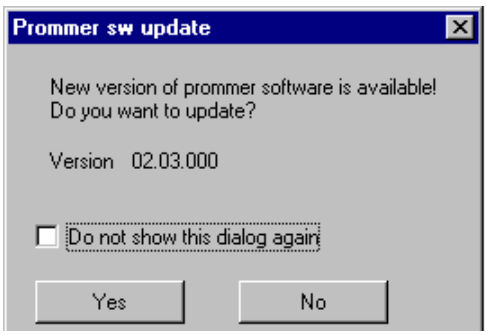
When phoenix SW has stared, do the following:

Click on **flashing**

Click on **FPS-8/FPS-8C Maintenance**

If SW inside FPS-8 prommer is too old, you get the following notification:

Figure 2: Prommer SW update screen



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Click **Yes** and you see on the small scree as the Prommer goes to service mode (mode2 is lit) SW goes into box, application SW , Secondary boot codes and algorithm codes are updated.

There is no longer need to do anything special with NHM-10 specific Secondart boot codes and algorithm codes.

Your PC and FPS-8 is now ready for NHM-10 SW update.

Reprogramming NHM-10

Connecting cables

Once you have the NHM-10 opened and the battery and SIM removed, attach it to the FLA-48 adapter. Once connected to the FLA-48 the phone goes to local mode and the screen will not show anything during SW update.

Proceed as follows:

- Connect XCS-4 cable from FLA-48 to FPS-8
- Connect FLC-2 cable from FPS-8 to FLA-48
- There is no need to press the phone power key. Phone has set itself automatically to local mode and it is now ready for SW update.

Settings backup/restore

It is quicker to use MMC user data backup, which can be found at: Menu > extras > memory > options > backup phone memory.

Start Phoenix SW by doubleclicking the **Phoenix icon** on your desktop.

- Now choose **File** -> **Scan product**. If phone is ok, you should see the SW version in lower right-hand corner, e.g. V3.1
- If the scanning finds nothing, the phone is most likely in some strange mode.

Settings Backup:

- Click **Product**
- Click **User settings**
- Click **All Settings**
- Click **Browse**
- Choose from Directory **C:\Program files\Nokia\Phoenix\Products** file **Nhl8sett.ini**

You will now see the following PC screen:

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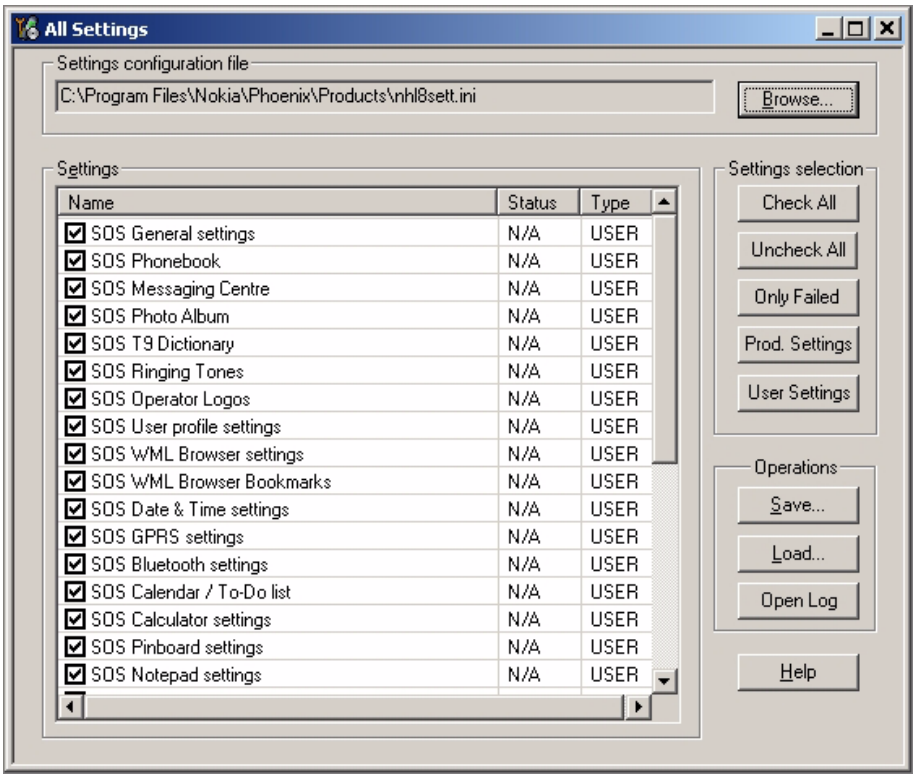
Figure 3: All settings screen



Updating software

New SW package can be updated.

- Choose **Flashing** -> **FPS-8 Flash** -> Mark both **log flashing** and **Manual Selection.** Then Click on **Flash.**
- Now in Flash file selection window, choose the product code.

Select the correct file:

Now click on **OK**, and SW update starts.

You will see as the 18 MB package goes into FPS-8 (If transfer is very slow, it is recommended that Parallel port is in ECP mode. Transfer in ECP mode is much faster).

If you do not know how to Change PC Parallel port mode from BIOS, contact your local support.

Then Phoenix erases flash memories .

And finally you will see how SW package goes into phone (When SW update takes place, Yellow Mode 1 led is blinking fast)

When SW update has ended yellow led stops blinking and you get a note in windows SW. You will get instructions to turn the phone on. Do so and wait 15 seconds..

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Formatting user area

User area also needeeds to be formatted in order to make sure that there is no user data left in the phone.

Choose **File** -> **Scan product. In the bottom of the Phoenix window you should see V3.1, Date, NHM-10(c) NMP**

Format User area the following way:

Click **Product** -> **User area format**. You will get a note warning you about loss of user data. Click **yes** on that.

Phoenix shows Formatting user data area, Please wait screen for a while and gives you a success note.

Restore settings

Settings can be restored from MMC or Phoenix.

Energy Management Calibration

Connections

NHM-10 phone must be connected to JBV-1 (Docking station) with MJF-31 (Docking station adapter).

- Connect CA-5S (DC-DC cable) from JBV-1 into to phone charger connector before powering up JBV-1.
- Power up JBV-1 from external power supply: 11-16 V DC. (Do not take power from FPS-8 in calibration mode).

Phoenix Setup

- Start Phoenix.
- Select FBUS connection.
- Choose *Main -> Choose product...*
- Choose *Maintenance -> Tuning -> Energy Management Calibration component.*

Calibration

1) Mark all channels (*ADC, Battery Size...except Battery temperature).*

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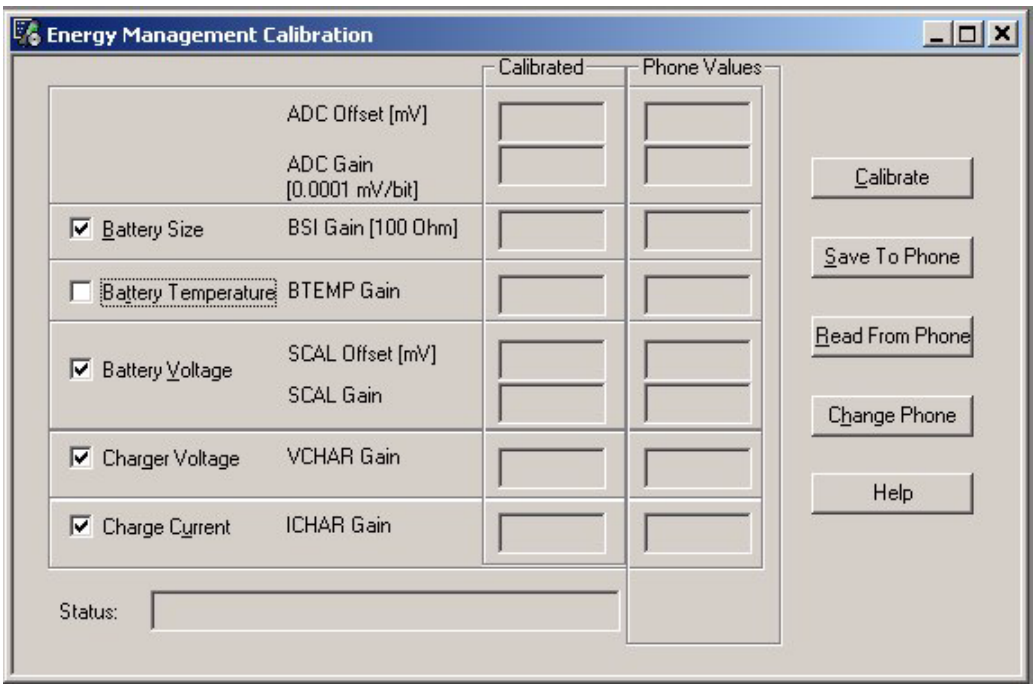
Figure 4: Energy Management Calibration screen



2) Press *Calibrate* button.

After successfull calibration *Calibrated* indication is shown.

3) Press *Save To Phone* to save tuning values into phone memory.

After successful saving *Values written to phone* is indicated.

4) Verify tuning values saving by pressing *Read from Phone.*

ZOCUS calibration

Zocus requires re-calibration only if the Zocus device itself is replaced, any of the components on the sense input (R383, R384 and C386) or if the flash memory is corrupted. Zocus does not require recalibration if the UEM device is replaced or if any of the other energy management calibrations are recalibrated.

1 Place the PWB in the module jig.

2 Connect an ammeter across the ammeter + and ammeter - connections.

3 Set switch S2 to the calibration position.

4 Power up the module jig in local mode - the ammeter will indicate the local mode current.

5 Connect the charger input to a power supply set to 8.4V and current limited to 500mA. Turn power supply on.

6 Open the Zocus EM window in Phoenix.

7 Click on "Close the Charge Switch".

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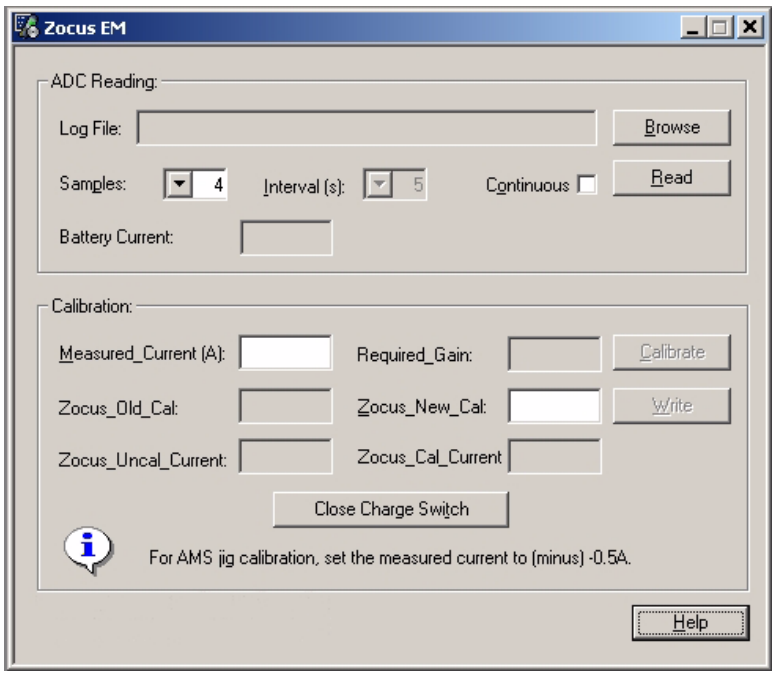
8 Adjust the current limit on the power supply until the ammeter reads 500mA ±5mA.

9 Type the measured current (read this from the ammeter) into the "Measured Current" box. The value is negative and presented in Amps e.g. if you measure 502mA, then type -0.502. The reading should be to the nearest mA.

10 Click the "Calibrate" button.

11 If you wish to check the calibrated value then do not choose to close the charge switch. The calibrated current value will appear in the Zocus_Cal_Current window.

12 The calibration value appears in the box Zocus_New_Cal. To write this to the phone click "Write".



Phoenix tuning

Connect the phone to a PC running the Phoenix Service Software.

Start Phoenix Service Software and open FBUS connection

Select File Scan Product

Wait until phone information is shown in the lower right corner of the screen.

RF tuning after repairs

Different repairs require different tuning. In general it is necessary to determine in which section the repair was done to select which tunings to perform. To determine if RF tuning is necessary after repair it is important that the functionality of the repaired circuit is understood well. It is recommended to perform complete RF tuning if RF is repaired.

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- In general repairs in the TX part will require "TX Power Level Tuning" and "TX IQ Tuning".
- In general repairs in the RX part or PLL part always require "RX Calibration", "Rx Band Filter Response Calibration".
- If Mjoelner is changed all calibrations have to be done.

Other parts interfacing to TX, RX or PLL might require tuning, but common sense should be used, e.g. if a component that has no influence on RF performance has been changed, e.g. the microphone, on/off key, mechanical parts or similar, there is no need to do any RF tuning.

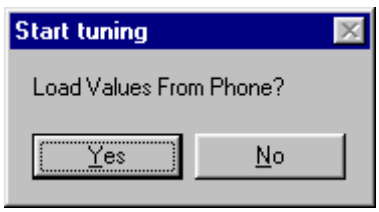
RX Channel Select Filter Calibration

This calibration is calibrating the Base band filter inside Mjoelner. It is done by internally measuring a prototype filter, for this reason the calibration is done once, not separately in 2 bands.

Set operating mode to local mode

Select	Maintenance	Alt-M
	Tuning	T
	RX Channel Select filter Calibration	H

A window pops up:



Select Yes and the RX Channel Select Filter Calibration window pops up.

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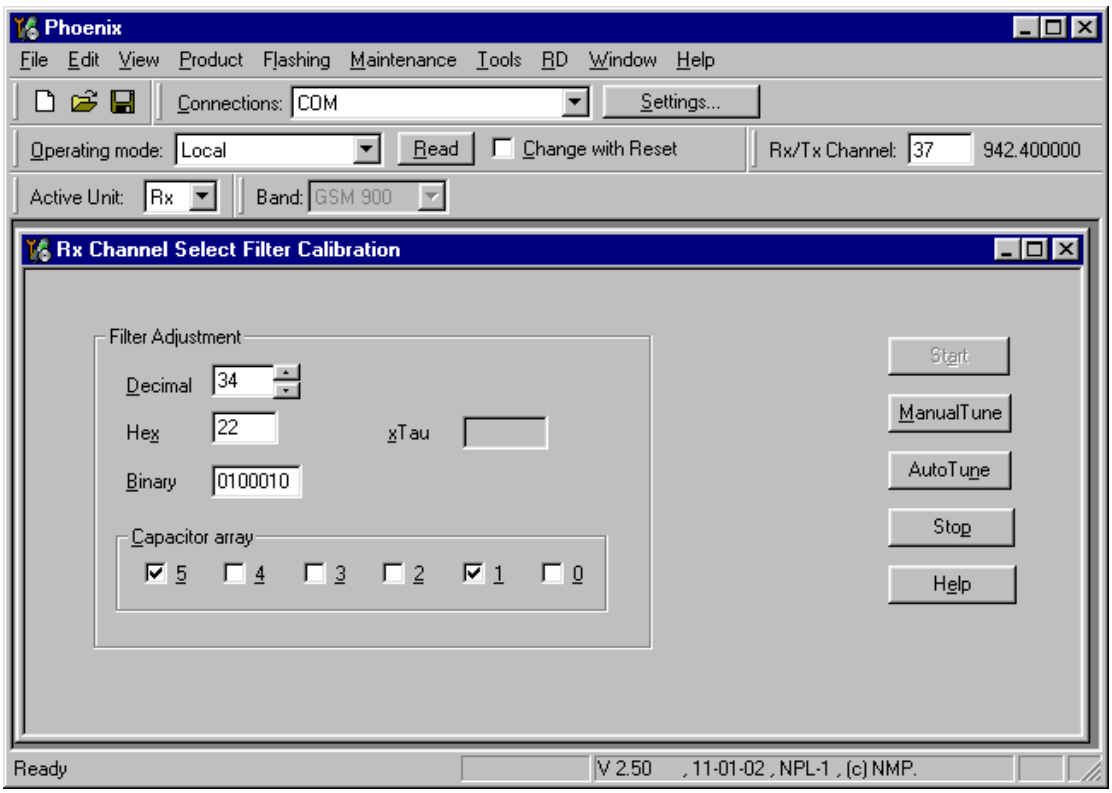
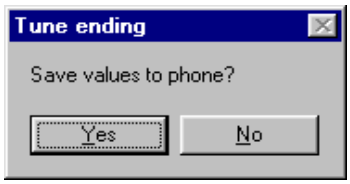
The setup should now look like this:



Press Autotune and the optimal values are found.

Press Stop and a new window pops up:



Press Yes and the RX Channel Select Filter Calibration is finished.

RX Calibration (incl. VCXO Calibration)

The "RX calibration" is used to determine gain at different gain-settings for front-end and Mjoelner and needs to be done in both bands.

RX-calibration requires an external signal generator.

RX-calibration in EGSM850 combines two tunings, VCXO-calibration and AGC-calibration:

Calibration of GSM1900 band only determines AGC values.

The **VCXO-calibration** finds out a calibration value for VCXO control, an AFC initial value and 3 AFC-slope coefficients.

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A value (RF_TEMP), which represents the RF hardware temperature, is determined during RX Calibration. This temperature value is used by DSP to RSSI reporting in Normal mode of the phone. It is not visible in the calibration process.

AGC-calibration:

The AGC-calibration finds the gain values of the RX-gain system.
The AGC consists of RF LNA, which can be either on or off (gain difference between on and off state is nominally 30dB) and BB gain which can be controlled in 6dB steps. This gives 15 gain steps RSSI0 to RSSI14. LNA is off for steps RSSI0 to RSSI4.
AGC-calibration measures the gain at gain step RSSI4 and RSSI7. The other gain values are calculated.

VCXO-calibration:

The VCXO-calibration ensures the function of an **initial** synchronization (before location update is done) when the mobile station is in Normal mode. For an error free initial synchronization, the 26MHz frequency of the VCXO must be accurate enough. Therefore, a **VCXO cal** value is written into the RefOSCCAL register of the Mjoelner.

During VCXO-calibration, the **VCXO cal** value is changed by a DSP-algorithm until a synchronization is possible. This means the VCXO oscillates at 26 MHz with a sufficient minimum frequency error.

To further minimize the frequency error, an initial **AFC value** is determined by the DSP and written into RefOSCAFC register of the Mjoelner.

Also the DSP algorithm determines 3 AFC slope coefficients **Slope C1...3** during VCXO calibration. One AFC slope value is not sufficient for Mjoelner **F3**, because the AFC slope is non-linear in this chip.

EGSM

Set operating mode to local mode

Select	Maintenance	Alt-M
	Tuning	T
	RX Calibration	C

Wait until the RX Calibration window pops up.

Select	Band	GSM 850
	Autom.-	60

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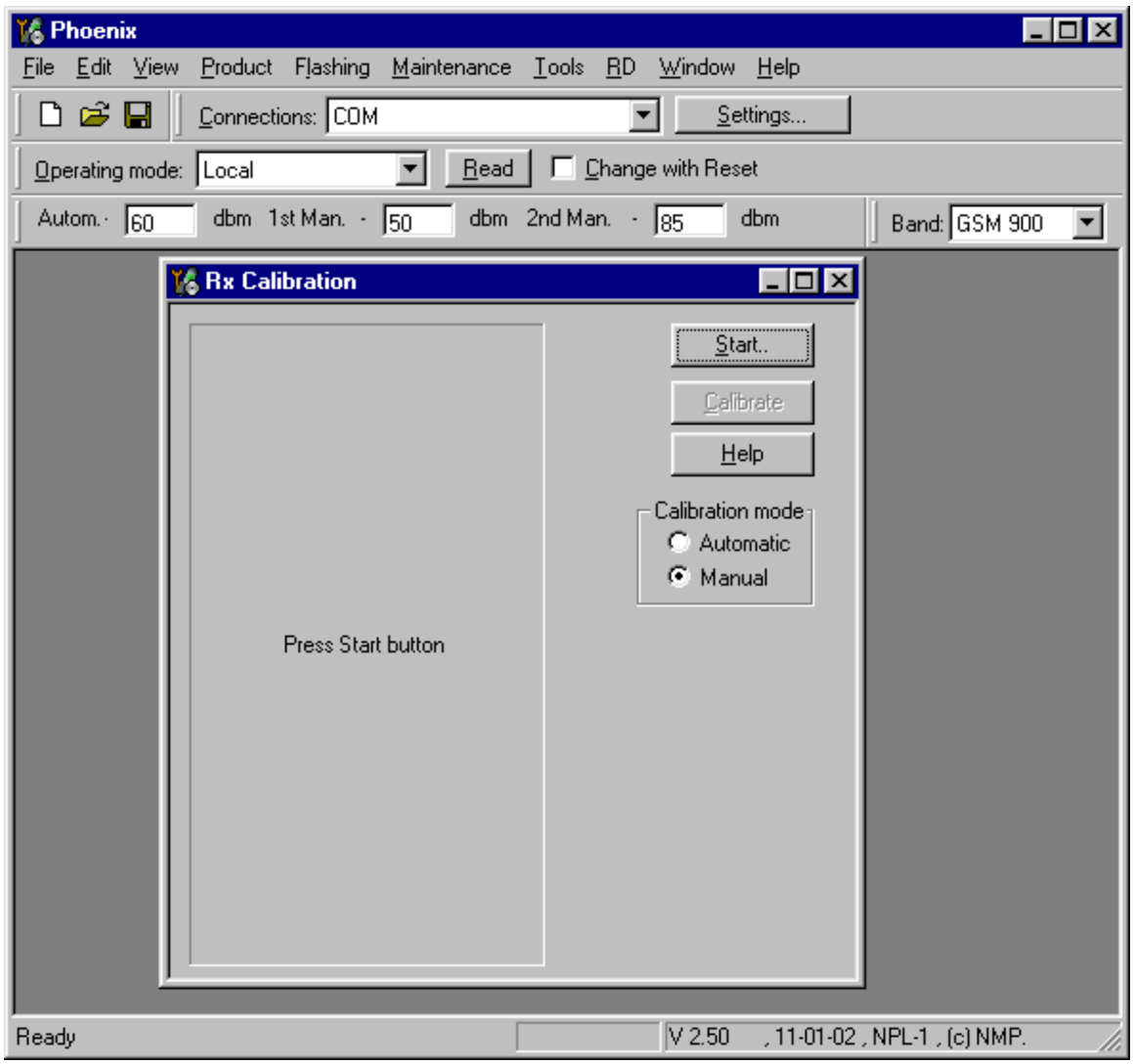
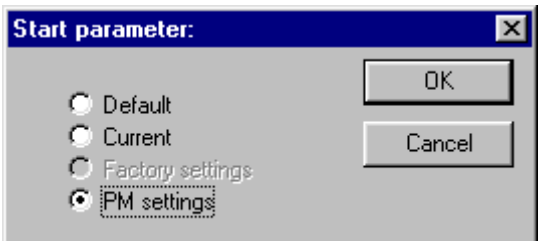
The setup should now look like this:



Select Automatic, press Start and a new window pops up:



Select PM settings, press OK and the window closes.

Now it is possible to press the calibrate button in the RX Calibration window.

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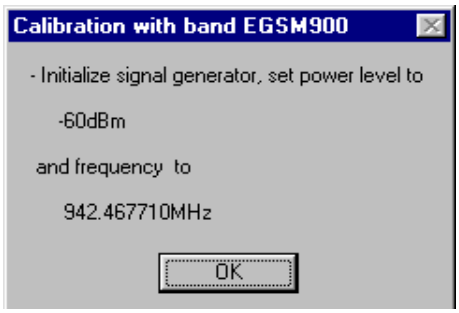
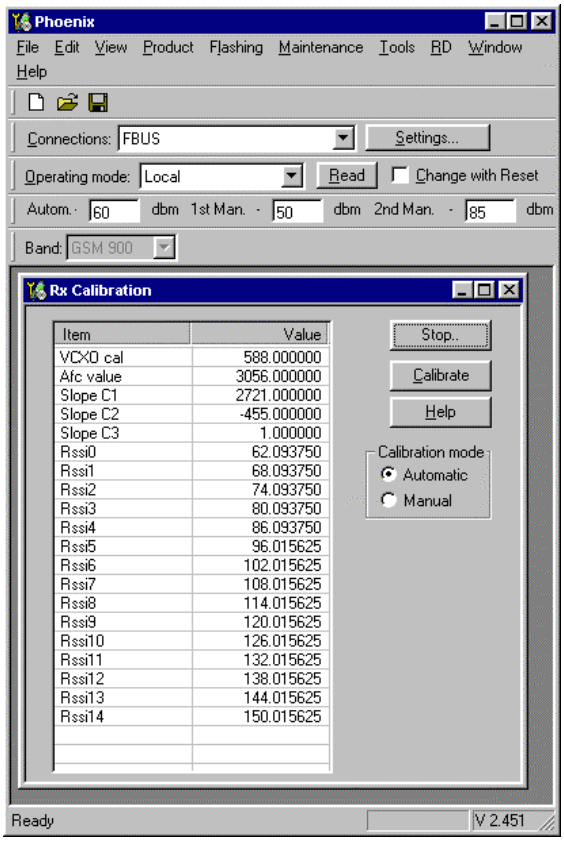
Press Calibrate and a window pops up:



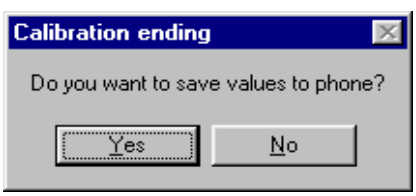
Connect an external signal generator to the RF connector of the phone and set the generator as told in the window, taking care for external cable losses.

Press OK and the window closes.

A typical result will look like this:



Press Stop in the RX Calibration window and a new window pops up:



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Press Yes and the EGSM RX Calibration is finished.

GSM1900 (PCS)

Set operating mode to local mode

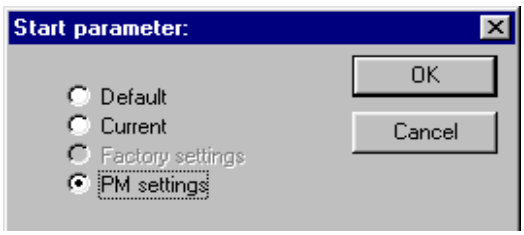
Select	Maintenance		Alt-M
		Tuning	T
			RX Calibration C

Wait until the RX Calibration window pops up.

Select	Band	GSM 1900
	Autom.	-60
	1st Man.	-50
	2nd Man.	-85

The setup should now look like this:

Select Automatic, press Start and a new window pops up:



Select PM settings, press OK and the window closes.

Now it is possible to press the calibrate button in the RX Calibration window.

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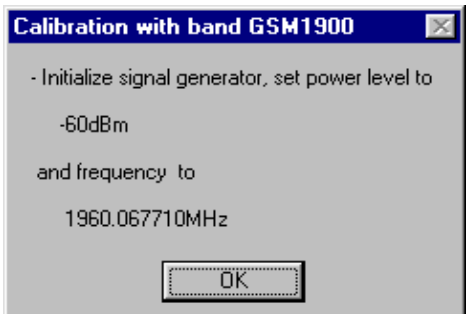
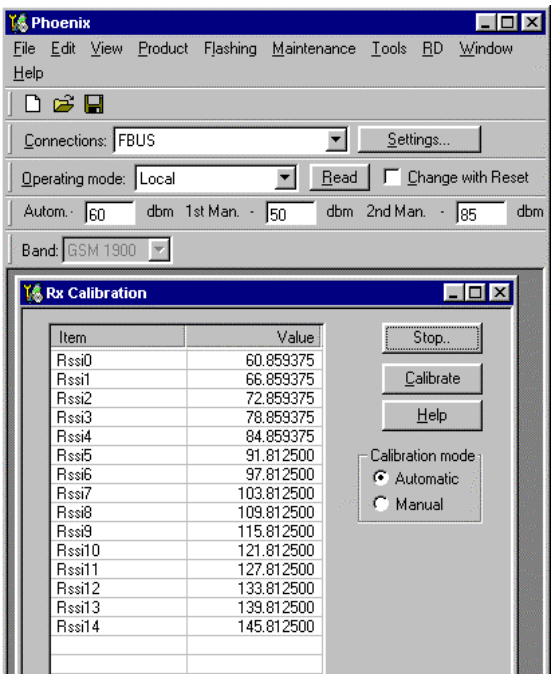
Press Calibrate and a window pops up:



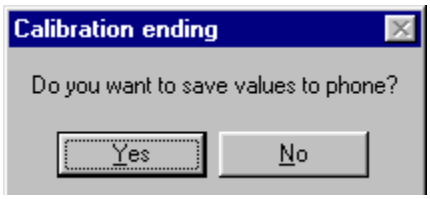
Connect an external signal generator to the RF connector of the phone and set the generator as told in the window, taking care for external cable losses.

Press OK and the window closes.

A typical result will look like this:



Press Stop in the RX Calibration window and a new window pops up:



Press Yes and the GSM1900 RX Calibration is finished.

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RX AGC limits

The Rx calibration is only valid if it is within certain limits.

For the most recent limits see NHM-10 Production Testing Requirements,

If calibration is not within limits, there is a fault in the RX chain.

Below the values for RSSI4 and RSSI7 are given:

RSSI4:

band	min	typ	max
EGSM850	81	86	91
GSM1900	79	85	89

RSSI7:

band	min	typ	max
EGSM850	103	108	113
GSM1900	100	104	110

RX Band Filter Response Compensation

EGSM850 (EGSM)

Set operating mode to local mode

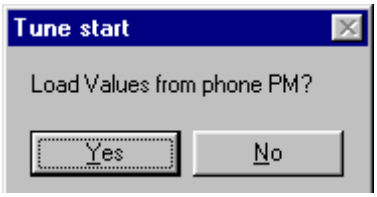
Select Maintenance Alt-M
Tuning T
RF Controls F

Wait until the RF Controls window pops up

Select Band GSM 850

Select Maintenance Alt-M
Tuning T
RX Band Filter Response Compensation B

A window pops up:



Select Yes and the RX Band Filter Response Compensation window pops up.

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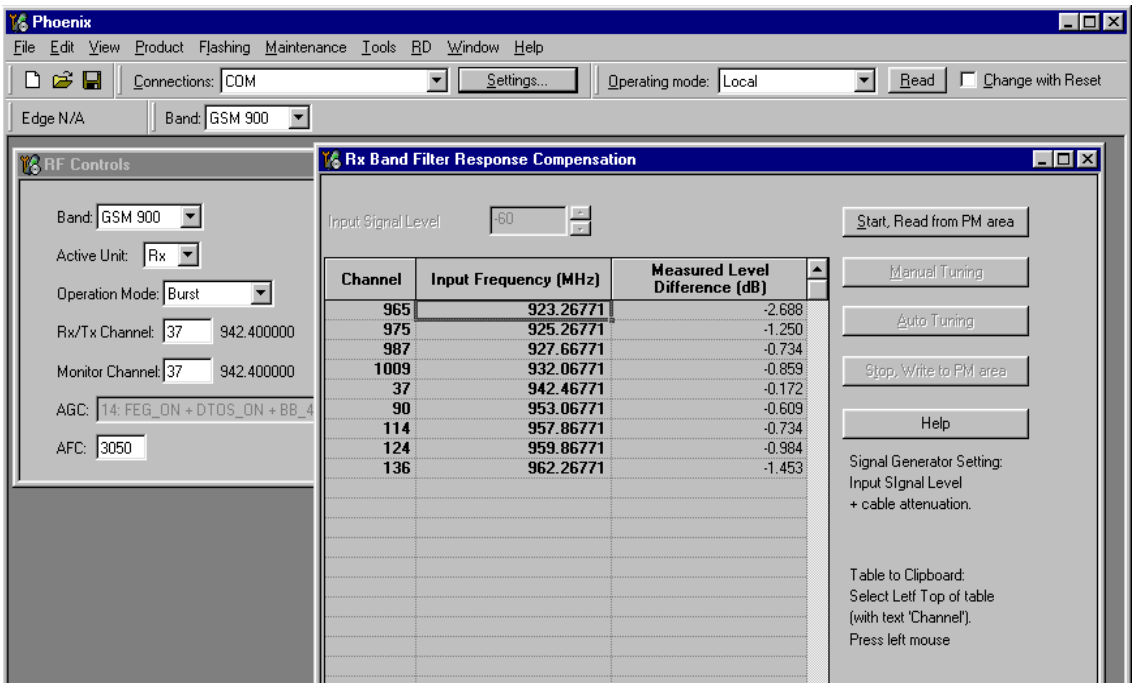
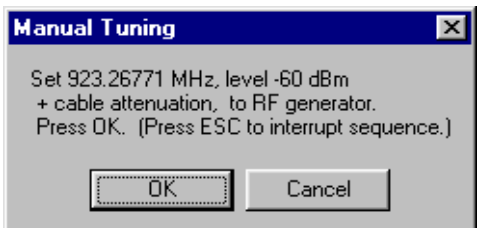
The setup should now look like this:



Select Input Signal Level -60dBm

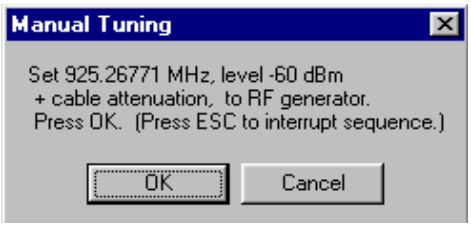
Manual Tuning

Press Manual tuning and a window pops up:



Connect an external signal generator to the RF connector of the phone and set the generator as told in the window.

Press OK and a new window pops up:



Set the generator as told in the window.

Press OK and a new window pops up. Repeat this sequence **9 times** until all channels are done.

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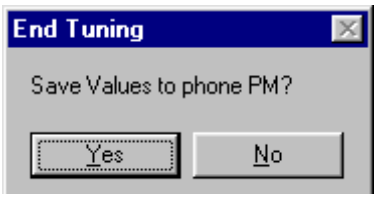
Press Stop, Write to PM Area (In the RX Band Filter Response Compensation window) and a window pops up:



Press Yes and the EGSM RX Band Filter Response Compensation is finished.

GSM1900 (PCS)

Set operating mode to local mode

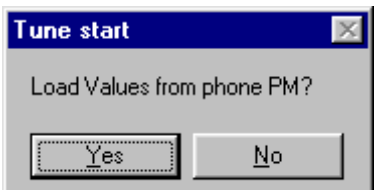
Select	Maintenance		Alt-M
	Tuning		T
		RF Controls	F

Wait until the RF Controls window pops up

Select	Band	GSM 1900	

Select	Maintenance		Alt-M
	Tuning		T
		RX Band Filter Response Compensation	B

A window pops up:



Select Yes and the RX Band Filter Response Compensation window pops up.

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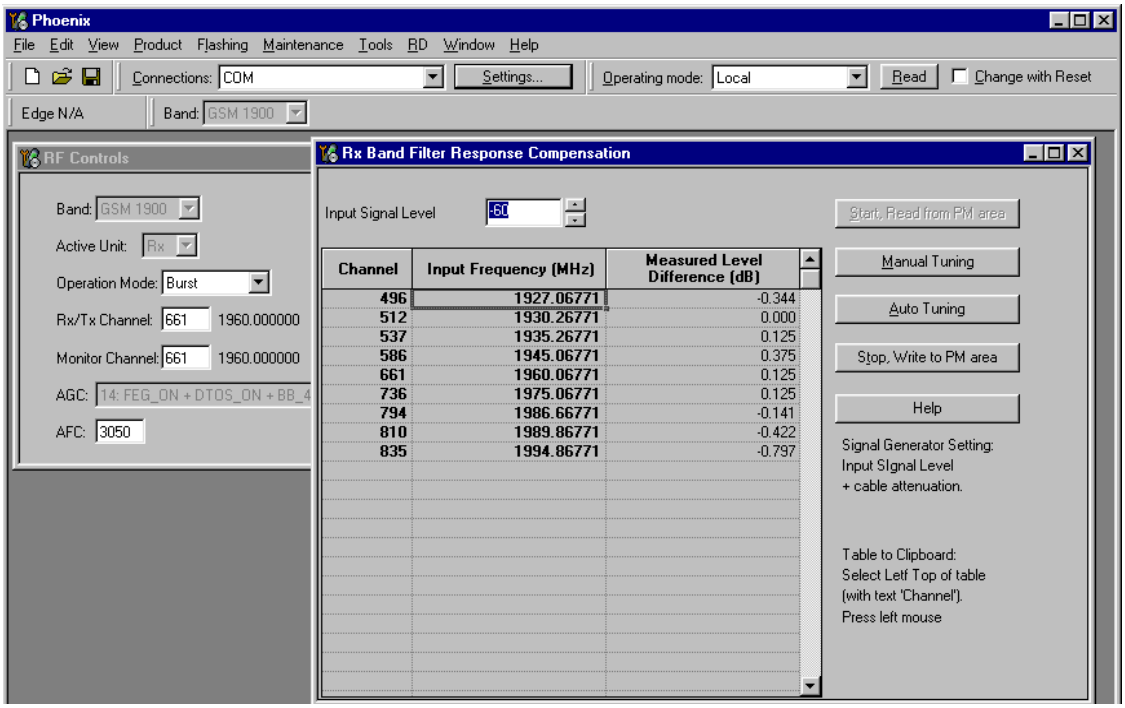
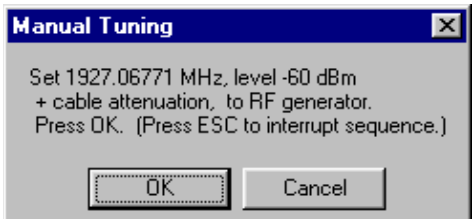
The setup should now look like this:



Select Input Signal Level -60dBm

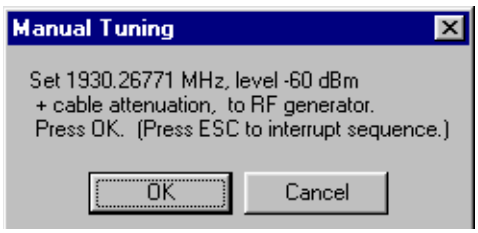
Manual Tuning

Press Manual tuning and a window pops up:



Connect an external signal generator to the RF connector of the phone and set the generator as told in the window.

Press OK and a new window pops up:



Set the generator as told in the window.

Press OK and a new window pops up. Repeat this sequense **9 times** until all channels are done.

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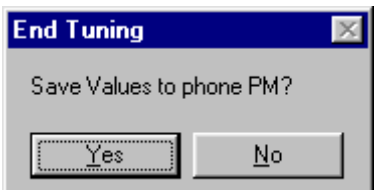
Press Stop, Write to PM Area (In the RX Band Filter Response Compensation window) and a window pops up:



Press Yes and the EGSM RX Band Filter Response Compensation is finished.

TX I/Q Tuning

This tuning must be done in both bands.

EGSM (EGSM850)

Caution: In case you use a spectrum analyser make sure that the external attenuation (20 - 30dB) between phone and spectrum analyser is high enough that the input of the analyser can't be destroyed. Adjust the reference level offset according to the insertion loss from the phone to the spectrum analyser .

PC/Phone operation:

Set operating mode to local mode

Select	Maintenance	Alt-M
	Tuning	T
	TX IQ Tuning	I

Wait until the TX IQ Tuning window pops up.

Select	Maintenance	Alt-M
	Tuning	T
	RF Controls	F

Wait until the RF Controls window pops up.

Connect a Spectrum Analyzer or GSM tester with the option *Narrow Spectrum' to the RF connector of the phone.

If a spectrum analyzer is used then use the following settings.

	EGSM/EGSM850
Center Frequency	897.4 MHz
Frequency Span	300 kHz
Resolution Bandwidth	3kHz
Video Bandwidth	3kHz
Sweep Time	3 sec.

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	EGSM/EGSM850
Sweep Type	Clear/Write
Detector Type	Max Peak
Reference level	35 dBm
Marker 1	897.33229 MHz
Marker 2	897.4 MHz
Marker 3	897.46771 MHz

Select in the RF Controls Window:

Select Band GSM 850
Active Unit TX
Operation Mode Burst
RX/TX Channel 37
TX PA Mode Free
TX Data Type All1

Select in the TX IQ Tuning Window:

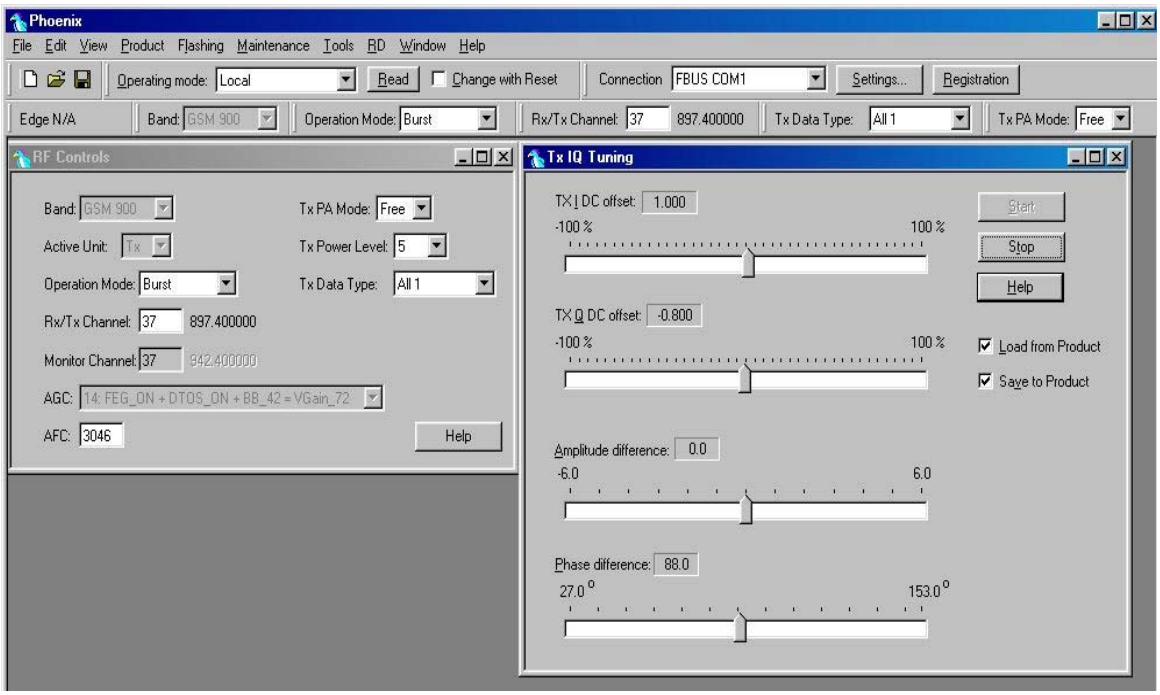
Select "Load from Product"
"Save to Product"

Press Start

Select again in the RF Controls Window:

Select TX Power Level 5

The setup should now look like this:



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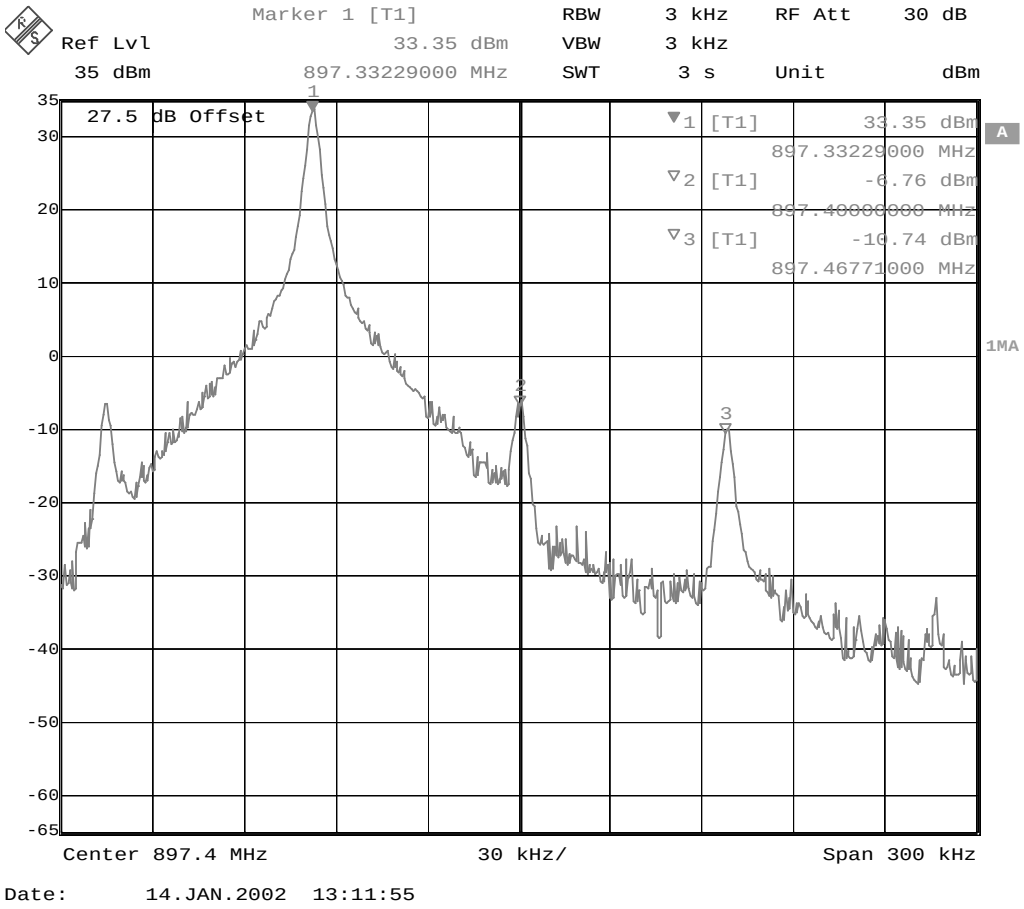
The Spectrum Analyzer now shows a plot like this:



The purpose of this tuning is to tune the carrier signal and the +67kHz signal to a minimum level (Marker 2 and 3).

Use the variables 'TX I DC offset' and 'TX Q DC offset' to adjust the carrier signal to a minimum level (Marker 2).

After tuning to the minimum the level difference between the peak levels at marker 1 and 2 must exceed 40dB.

Tuning is possible by using arrow keys on the keyboard. Pushing the sliders by using the mouse is less sensitive but even possible.

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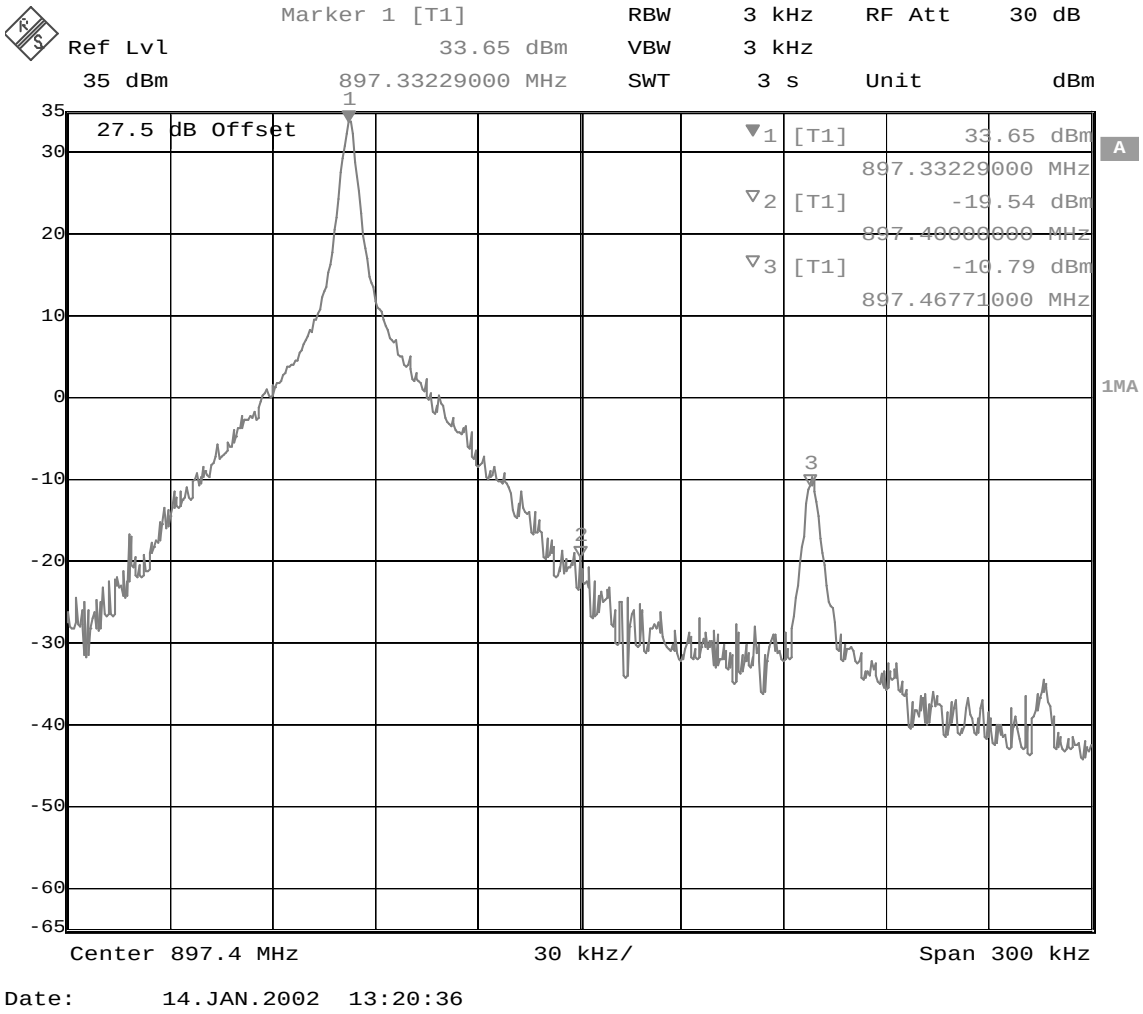
The Spectrum Analyzer now shows a plot like this:



Use the variables 'Amplitude difference' and 'Phase difference' to adjust the +67kHz signal to a minimum level (Marker 3). After tuning to the minimum the level difference between the peak levels at marker 1 and 3 must exceed 40dB. Tuning is possible by using arrow keys on the keyboard. Pushing the sliders by using the mouse is less sensitive but even possible.

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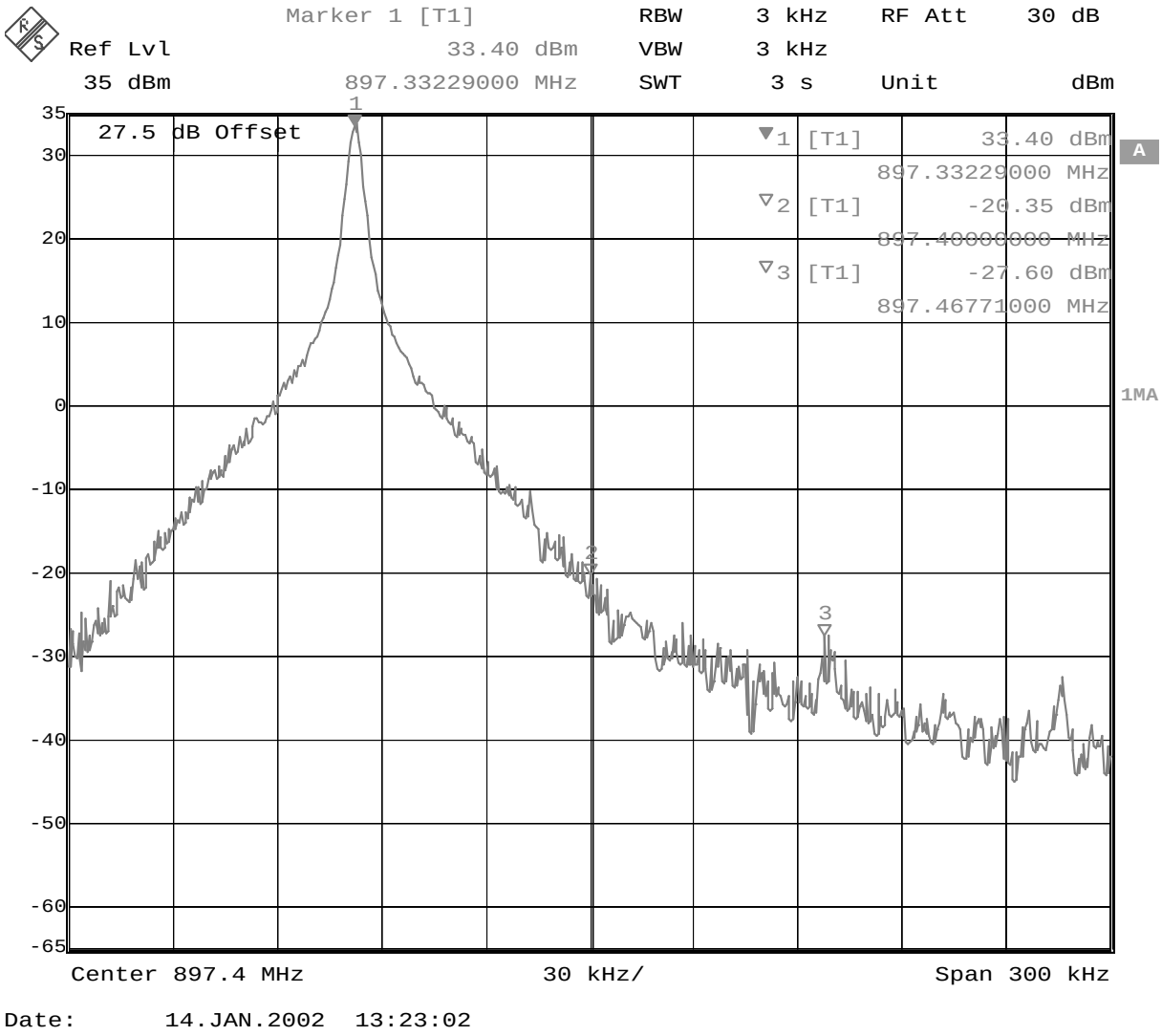
The Spectrum Analyzer now shows a plot like this:



Select again in the RF Controls Window:

Select "Save to Product"

Press Stop and the values are stored in the phone.

The EGSM TX IQ Tuning is now finished.

Note: The optimal values for "TX I and Q Offset" and "Amplitude and Phase Difference" vary from phone to phone.

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GSM1900 (PCS)

Caution: In case you use a spectrum analyser make sure that the external attenuation (20 – 30dB) between phone and spectrum analyser is high enough that the input of the analyser can't be destroyed. Adjust the reference level offset according to the insertion loss from the phone to the spectrum analyser .

PC/Phone operation:

Set operating mode to local mode

Select	Maintenance	Alt-M
	Tuning	T
	TX IQ Tuning	I

Wait until the TX IQ Tuning window pops up.

Select	Maintenance	Alt-M
	Tuning	T
	RF Controls	F

Wait until the RF Controls window pops up.

Connect a Spectrum Analyzer or GSM tester with the option *Narrow Spectrum' to the RF connector of the phone.

If a spectrum analyzer is used then use the following settings.

	GSM1900
Center Frequency	1880MHz
Frequency Span	300 kHz
Resolution Bandwidth	3 kHz
Video Bandwidth	3 kHz
Sweep Time	3 sek.
Sweep Type	Clear/Write
Detector Type	Max Peak
Reference level	35 dBm
Marker 1	1879.93229 MHz
Marker 2	1880 MHz
Marker 3	1880.06771 MHz

Select in the RF Controls Window:

Select	Band	GSM 1900

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Active UnitTX	
Operation Mode	Burst
RX/TX Channel	661
TX PA Mode	Free
TX Data Type	All1

Select in the TX IQ Tuning Window:

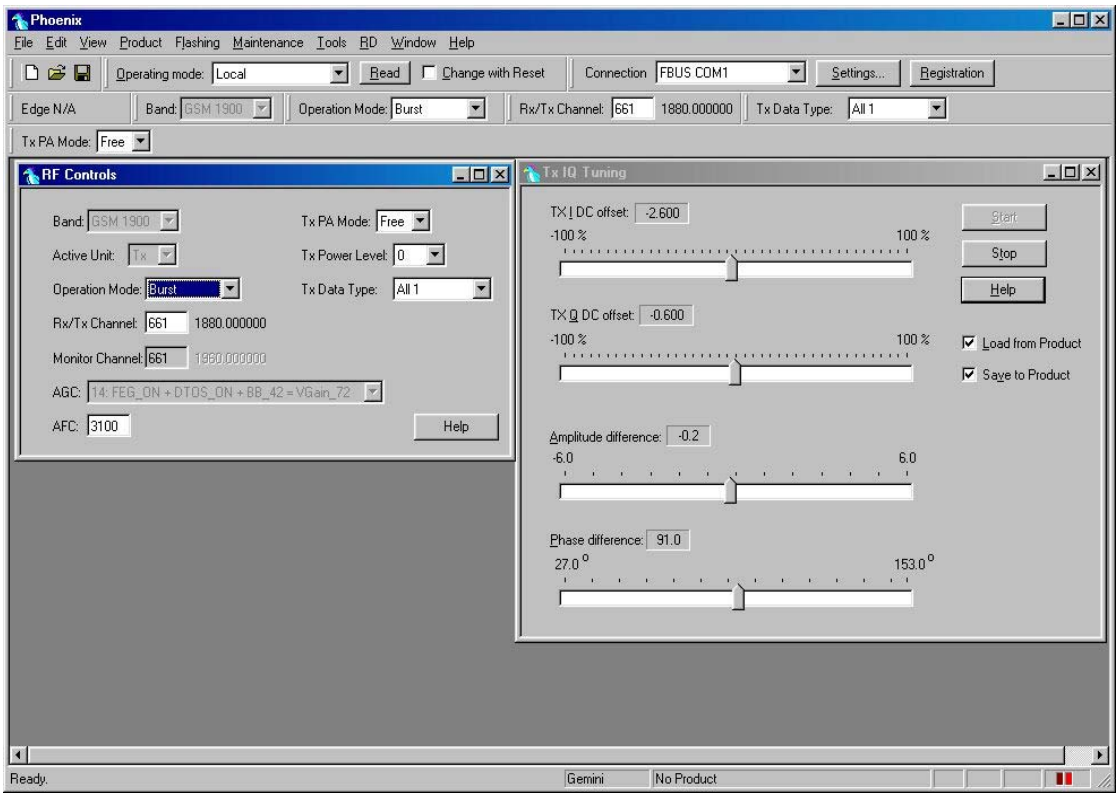
Select "Load from Product"
"Save to Product"

Press Start

Select again in the RF Controls Window:

Select TX Power Level 0

The setup should now look like this:



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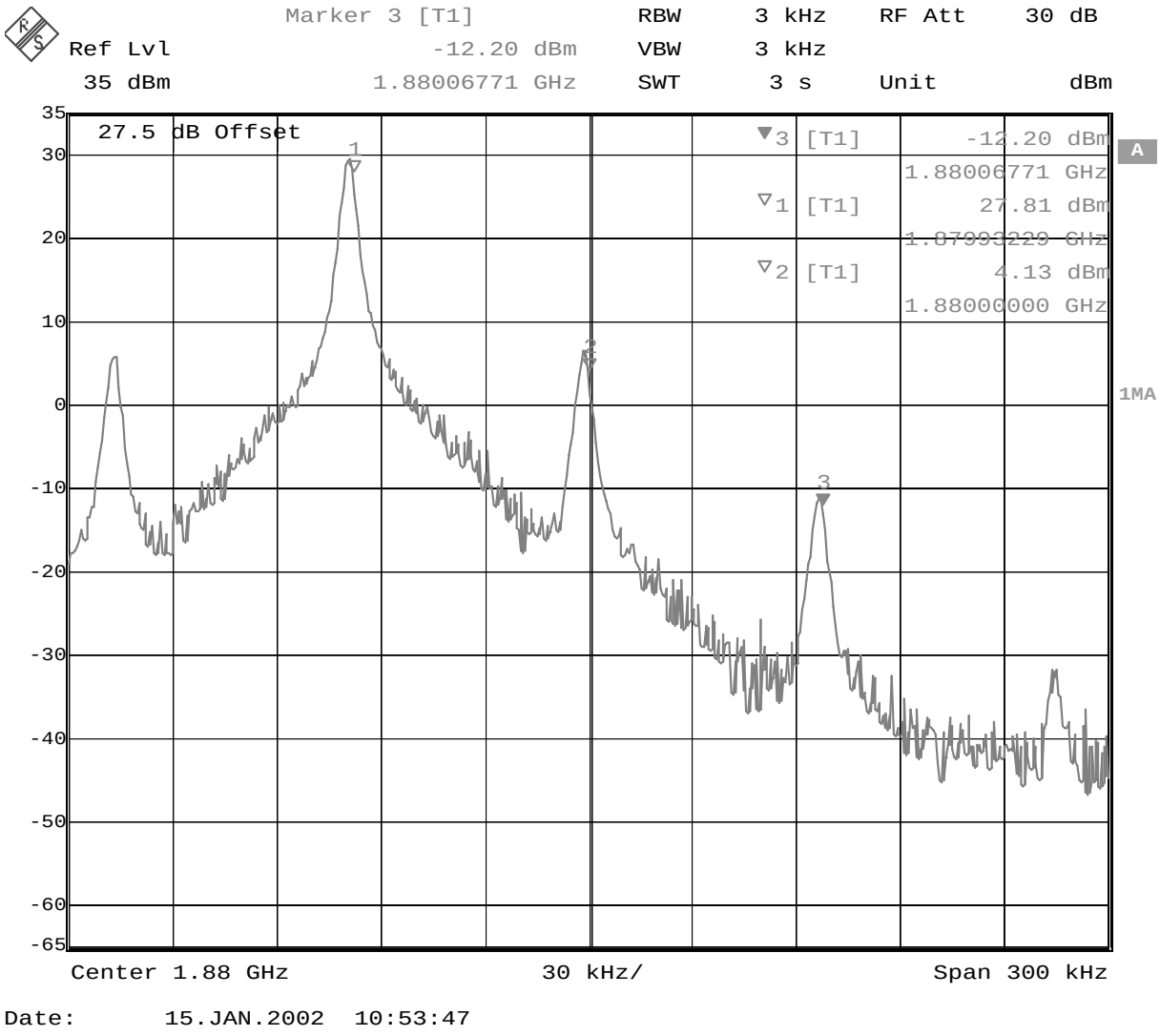
The Spectrum Analyzer now shows a plot like this:



The purpose of this tuning is to tune the carrier signal and the +67kHz signal to a minimum level (Marker 2 and 3).

Use the variables 'TX I DC offset' and 'TX Q DC offset' to adjust the carrier signal to a minimum level (Marker 2).

After tuning to the minimum the level difference between the peak levels at marker 1 and 2 must exceed 40dB.

Tuning is possible by using arrow keys on the keyboard. Pushing the sliders by using the mouse is less sensitive but even possible.

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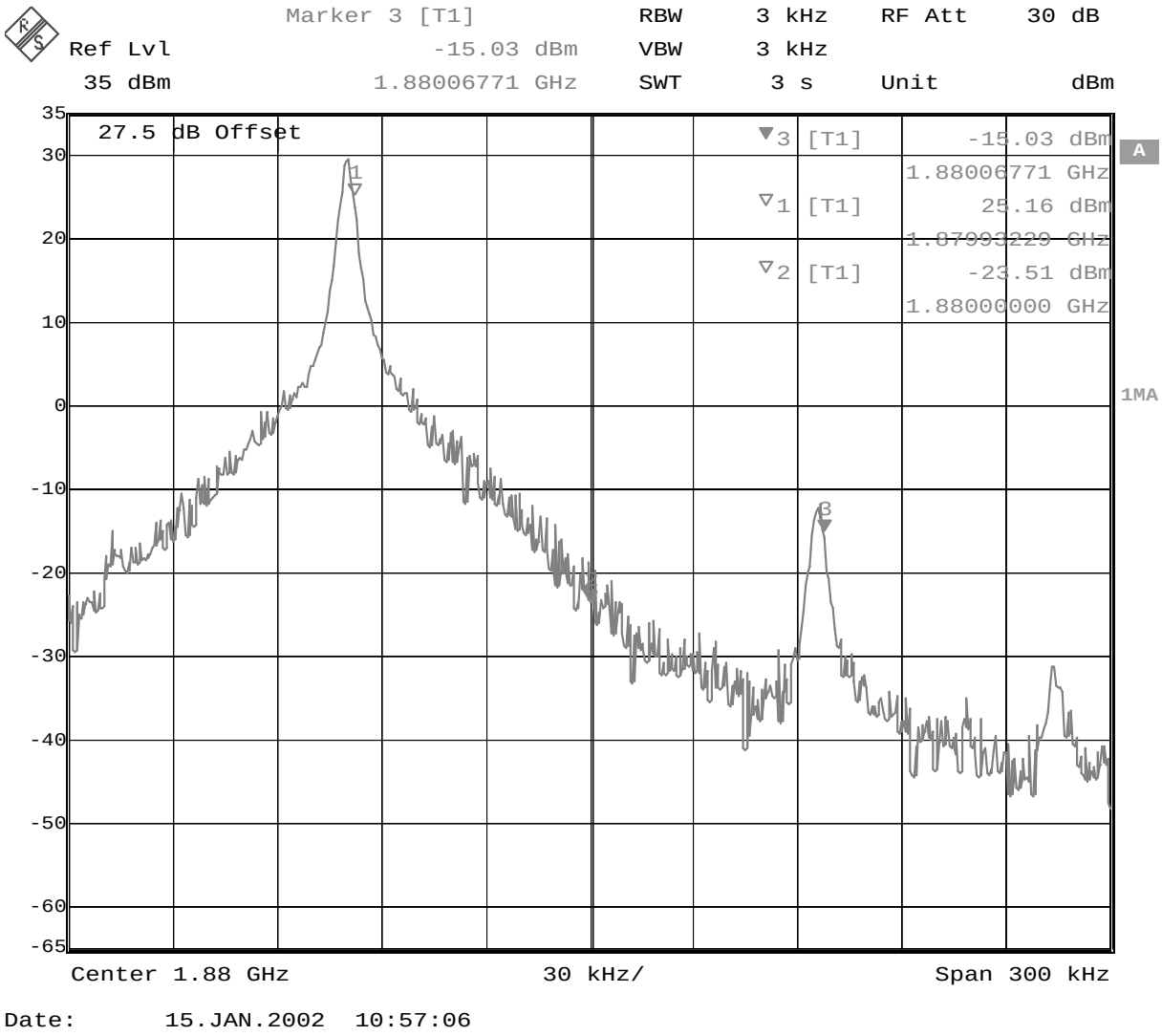
The Spectrum Analyzer now shows a plot like this:



Use the variables 'Amplitude difference' and Phase difference' to adjust the +67KHz signal to a minimum level (Marker 3). After tuning to the minimum the level difference between the peak levels at marker 1 and 3 must exceed 40dB, Tuning is possible by using arrow keys on the keyboard. Pushing the sliders by using the mouse is less sensitive but even possible'

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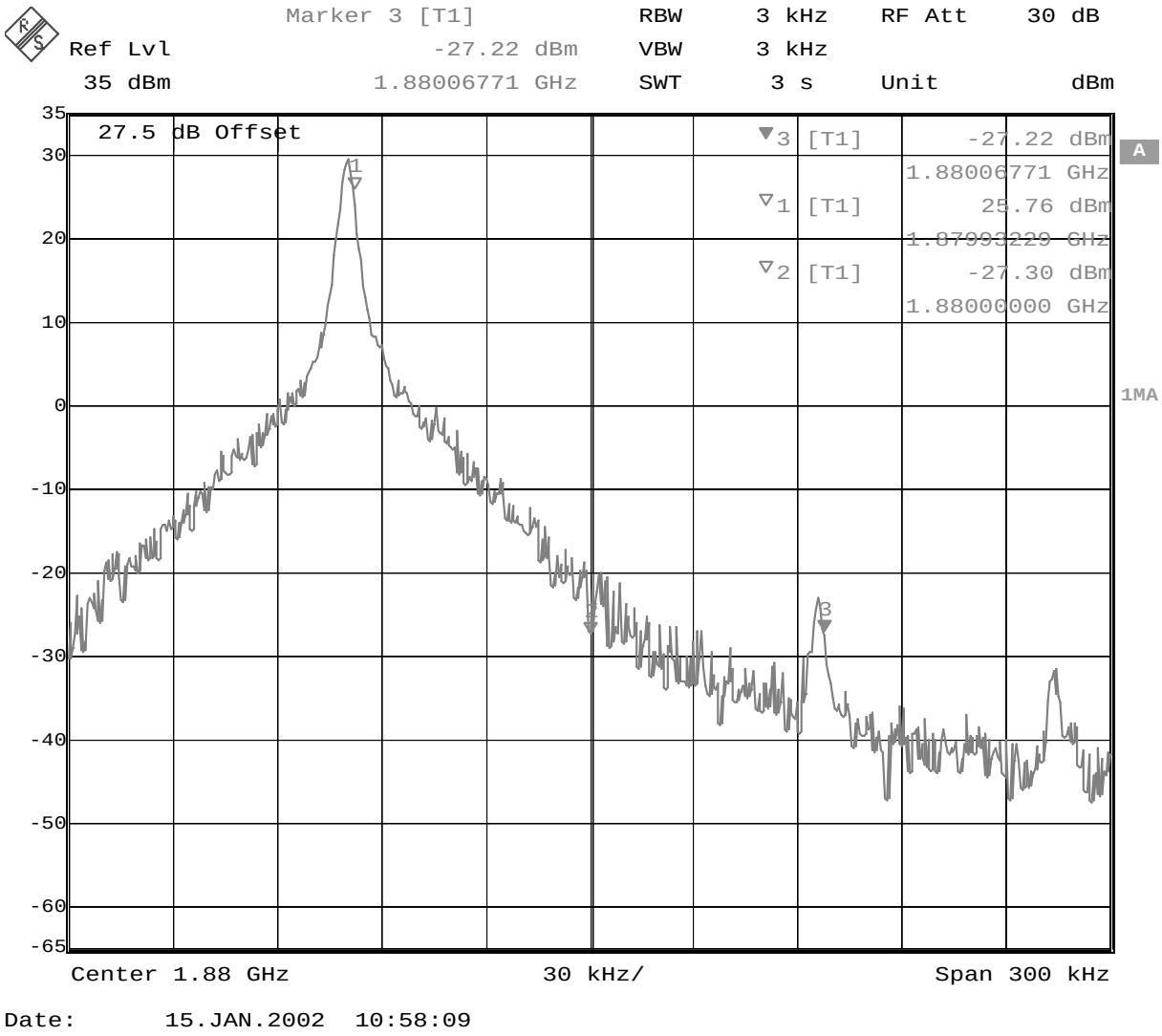
The Spectrum Analyzer now shows a plot like this:



Select 'Save to Product'

Press Stop in the TX IQ Tuning Window and the values are stored in the phone.

The GSM1900 TX IQ Tuning is now finished.

Note: The optimal values for "TX I and Q Offset" and "Amplitude and Phase Difference" vary from phone to phone.

TX Power tuning

This tuning must be done in both bands.

Note: TX Power tuning must be done with a peak power meter, e.g. Anritsu model ML2408A with Anritsu Peak Power Sensor MA2442A and a suitable attenuator.

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The use of power meter in GSM testers is likely to cause larger error than the use of a dedicated power meter and might cause the phone to be non-compliant with GSM specifications.

EGSM (EGSM850)

Set operating mode to local mode

Select Maintenance Tuning TX Power Level Tuning

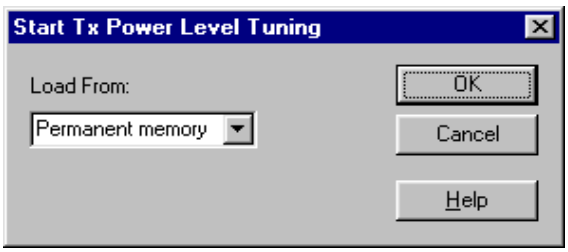
Wait until the TX Power Level Tuning window pops up.

Connect a **calibrated** powermeter to the RF connector of the phone.

Select Band GSM 850

Active Unit TX

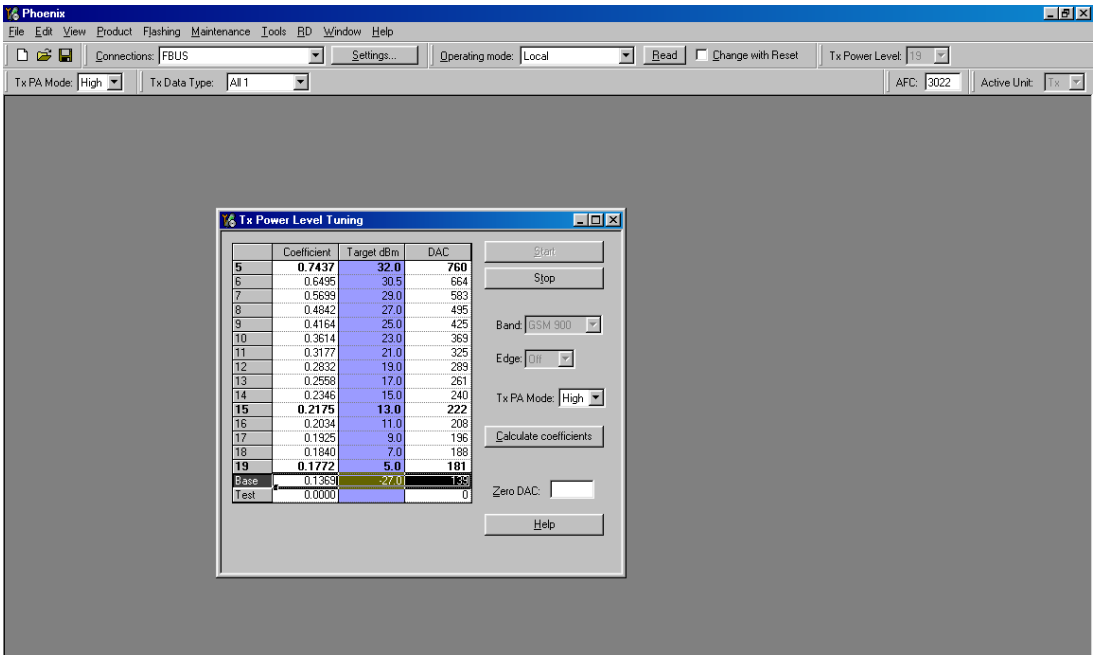
Press Start and a window pops up:



Select Permanent memory, press OK and the window closes.

Select TX Data Type Random

The setup should now look like this:



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Select TX PA Mode High

Tune Base level to –27 dBm.

Adjust DAC Values for Power Level 5 (32 dBm), 15 (13 dBm) and 19 (5 dBm) according to Target values. The Power levels may differ from Phoenix mentioned target power levels.

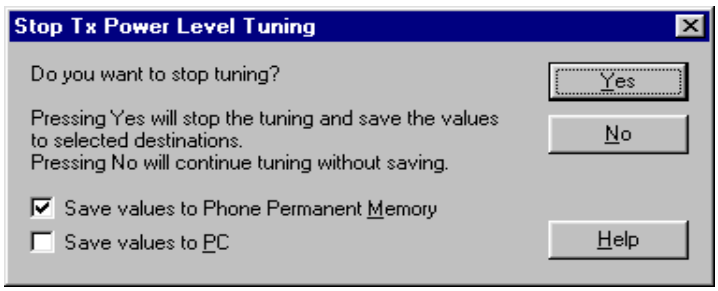
Press calculate, check if all levels match the target values, correct if necessary.

Select TX PA Mode Low

Adjust DAC Values for Power Level 7, 15 and 19 according to Target values.

Press calculate, check if all levels match the target values, correct if necessary.

Press Stop and a window pops up:


Stop Tx Power Level Tuning
Do you want to stop tuning?
Yes
Pressing Yes will stop the tuning and save the values to selected destinations.
Pressing No will continue tuning without saving.
No
Save values to Phone Permanent Memory
Save values to PC
Help

Select 'Save values to Phone Permanent Memory'

Press Yes and the EGSM TX Power Level Tuning is finished.

GSM1900 (PCS)

Set operating mode to local mode

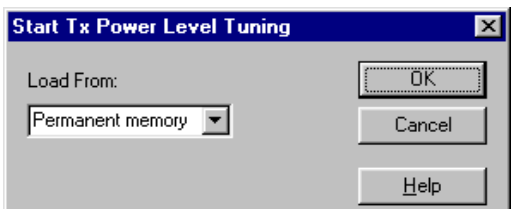
Select Maintenance Tuning TX Power Level Tuning

Wait until the TX Power Level Tuning window pops up.

Connect a **calibrated** powermeter to the RF connector of the phone.

Select Band GSM 1900
Active Unit TX

Press Start and a window pops up:



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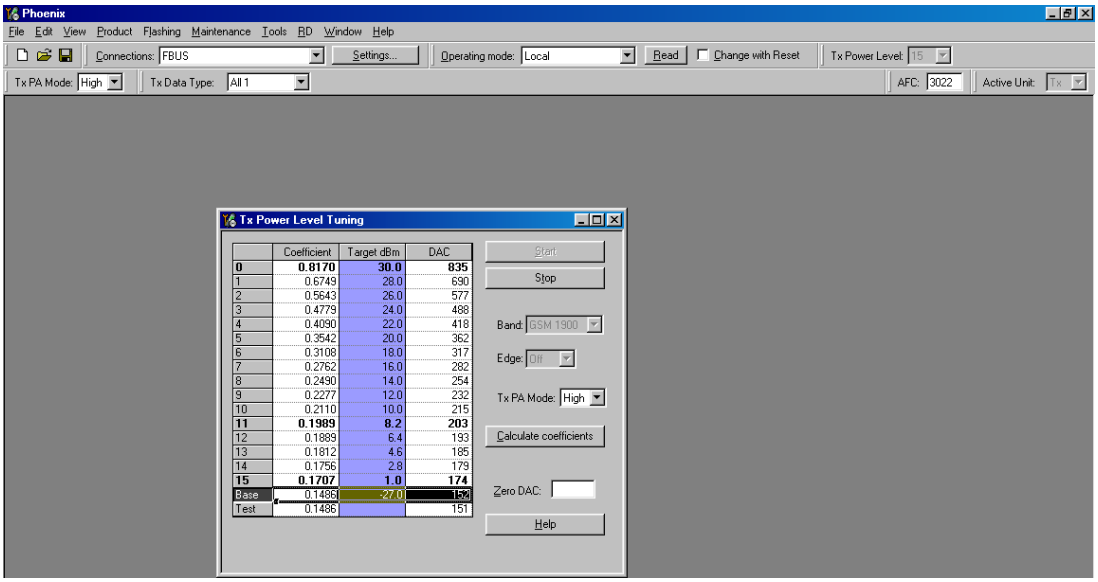
Select Permanent memory, press OK and the window closes.

Select TX Data Type Random

The setup should now look like this:



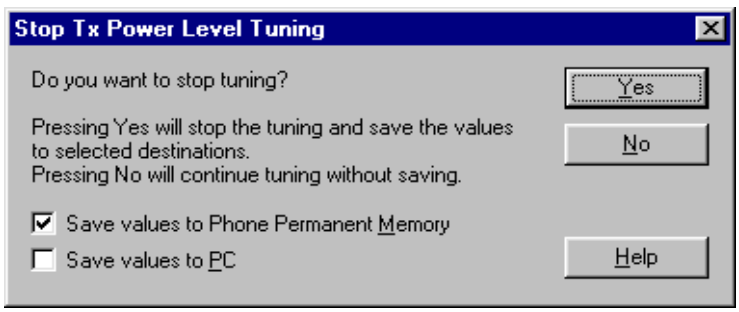
Select TX PA Mode High

Tune Base level to –27 dBm.

Adjust DAC Values for Power Level 0 (30 dBm), 11 (8.2 dBm) and 15 (1 dBm). The Power levels may differ from in Phoenix mentioned target power levels.

Press calculate, check if all levels match the target values, correct if necessary.

Press Stop and a window pops up:


Stop Tx Power Level Tuning
Do you want to stop tuning?
Yes
Pressing Yes will stop the tuning and save the values to selected destinations.
Pressing No will continue tuning without saving.
No
Save values to Phone Permanent Memory
Save values to PC
Help

Select 'Save values to Phone Permanent Memory'

Press Yes and the GSM1900 TX Power Level Tuning is finished.

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